

**National Atmospheric Deposition Program
Fall Meeting
Seattle Center
Seattle, WA
September 10-13, 2002**

Minutes of the Meeting of the Subcommittee on Network Operations

Tuesday, September 10, 2002

Kristi Morris called the NOS meeting to order at 1:00 p.m.

Attendees introduced themselves and their affiliation.

The meeting agenda is provided in Attachment 1. List of meeting attendees is provided in Attachment 2.

Motion 1: Approve NOS meeting minutes-May 6-8, 2002 (Pacific Grove, CA) as summarized on the NADP website (<http://nadp.sws.uiuc.edu/meetings/>).

Motion seconded and passed.

AGENDA ITEM 1 – Report from July Executive Committee Meeting, Kristi Morris/USFWS

Motions from the July 2002 executive committee meeting, held in Denver, CO:

- The executive committee charged NOS with finding resolution on equipment modernization
 - Including: electronic field form, modern wet deposition collector/precipitation gage with electronic data transfer
- Executive committee recommends to the technical committee that field chemistry measurements be eliminated beginning January 2003

AGENDA ITEM 2 – New Version of the Ott-Pluvio Precipitation Gage, Malcolm Lynch/CC Lynch and Associates

Synopsis:

- Presented an update on the new raingage model
 - Discussed changes since old model
- Introduced LogoSens, a data logger developed by Ott, considered the “brain” of the raingage

- Introduced equipment developed by the Thies Company, based in Germany
 - Introduced meteor burst communication technology which involves bouncing signals off atmosphere, range of 1000 miles, with no dead areas within the United States
 - Discussed GOES satellite communication system
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AGENDA ITEM 3 – N-CON Modification #2 Mercury Collector, Mark Nilles/USGS

Background:

At the May 2002 meeting, Mark Nilles presented a report on initial findings from the Boston Urban Gradient Mercury Deposition Study, which tested the N-CON mercury collector.

Synopsis:

- Update on Ott Pluvio Phase III Test
 - Seven gages included in test at 6 sites
 - Final report is under review
 - Four N-CON mercury collectors purchased for mercury gradient study, since January 2002
 - Problems have been detected due to the two-arm design (arms supporting the collector lid)
 - Plan to test new N-CON design that includes four arms and smaller sample collection volume
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Motion 2: Van Bowersox moved that HAL audits be conducted on the same cycle (every 3 years) as the Central Analytical Laboratory audits, but not on the same year, beginning in 2003.

Dennis Lamb seconded motion.

Motion passed.

AGENDA ITEM 4 – Data Relay in the Brave New World-Part 2, Scott Dossett/NADP

Please see attachment 3 for presentation.

Background: Data Relay in the Brave New World-Part 1 was presented by Scott Dossett at the May 2002 meeting. Equipment failure, sometimes due to unfavorable weather conditions, necessitates electronic data relay. In the presentation, data relay options were presented, along with equipment descriptions and approximate costs.

Synopsis:

- Assumptions:
 - NADP site operators will collect precipitation samples and send to the laboratory
 - Field sampling will occur in changing conditions
 - Site operators' experience is highly variable
 - Program goals for data completeness will remain constant
 - Maintaining uniform equipment across the network will continue

 - Equipment specifications:
 - Media must be moderately sized, easily transferable and economical
 - Solid state, battery powered, hand-held device
 - Pre-programmed versatile device
 - Operator active in passing data on
 - No reliance on local sources of support

 - Example of PDA device (please see attachment 3 for descriptive pictures):
 - Function test result checkboxes
 - Internal programmed query results
 - Power supply status and history
 - Operator can finish report by keying in data in the lab
 - Device supplies general information: time and date, site id, etc.
 - Digital memory card is shipped to the laboratory with the weekly precipitation sample
-

DISCUSSION

Discussion ensued on not pursuing data relay systems that are produced with proprietary code. The network requires a system that is simple, robust and has checks built into the system that the Program Office can fix. The network should not rely on other contractors, enabling problem solving to stay with the network.

Motion 3: Van Bowersox moved to pursue Personal Digital Assistant (PDA), palm pilot technology for data relay.

(Karen Harlin proposed a friendly amendment to be less explicit and change 'PDA, palm pilot technology' specification to 'electronic data transfer'. The amendment was not accepted, since it does not specify a hand held unit, which is desired).

Motion seconded and passed.

AGENDA ITEM 5 – Ad Hoc Committee Report: Value of Field Chemistry, Chris Lehmann/NADP

Please see Attachment 4 for presentation.

Background:

An ad hoc committee was formed to explore the value of field chemistry measurements at the May 2002 NOS meeting, where a motion was made to eliminate field measurements in January 2003. The motion failed to pass. The subject would be reevaluated at the fall 2002 meeting, based on the committee's findings.

Synopsis:

- Field chemistry measurement program:
 - CAL support:
 - CAL supplies pH probes, training, calibration and check samples, instructions
 - Sites provide their own pH meter, conductivity meter, conductivity cell
 - External QA:
 - External QA assesses operator and equipment performance
 - USGS conducts semi-annual Intersite comparison studies by supplying sites with solutions of unknown pH and specific conductance to the site operator
 - Sites report pH and specific conductance values which are used to assess individual site performance
 - >90% of sites met pH and conductivity targets in 2001
- Cost:
 - Cost to CAL--\$2.00-\$2.50 per site, per week
 - Cost to site for equipment--\$2.50-\$3.50 per site, per week
 - Site labor: ~\$5.00-\$15.00 per site, per week
 - USGS cost--\$1.25-\$2.00 per site, per week
 - Entire cost to NADP and funders per year: ~\$134,000-\$290,000
- Site operator survey:
 - pH measuring system works well most of the time
 - Most weekly measurements take less than 30 minutes
 - Most data users use both laboratory and field measurements
- Issues supporting continuance of field chemistry measurements:
 - Field chemistry data is utilized by data users
 - Continue the 24-year data record
 - Field measurements are not influenced by sample handling and transport
 - Differences between field and laboratory measurements exist
 - Field measurements are a QC tool to assess sample chemistry changes between field and laboratory, and ensure that samples are not switched or misplaced

- Field chemistry measurements will provide a QC tool for the future equipment changes that are planned for the NADP
 - Issues against continuance of field chemistry measurements:
 - Quality control criteria for laboratory measurements are more stringent than field measurements
 - Laboratory measurements are given priority over field measurements for low volume samples
 - Data quality can be irregular due to inexperience of operators, equipment condition, etc.
 - Recommendations:
 - NTN and AIRMoN should be considered separately
 - AIRMoN serves as a research network
 - Different sampling protocols between NTN and AIRMoN
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DISCUSSION

Value of field measurements

Points addressed:

- Site operators don't know anyone who uses the field data and 90% of site operators would support ceasing field chemistry measurements
 - Field chemistry measurements are the closest measurements to the precipitation event
 - Site operators have stated that field measurements provide a sense of importance to the procedure of sample collection
 - Field measurements complicate site operations
 - Availability of laboratories for conducting field measurements are difficult to come by for many sites
 - Money could be better spent elsewhere
 - Cost estimate: \$2-\$2.50 per site/per sample for pH and specific conductance measurement
 - Equivalent cost of site maintenance (equipment supply, troubleshooting, etc.)
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Motion 4: Cari Furiness moved that a report be produced that summarizes field and laboratory measurements for NTN for 25 years.

Friendly amendment: Program Office produces report of the 25-year study that will be mailed to site operators by Scott Dossett/NADP.

Dennis Lamb seconded motion.

Motion passed.

Failed Motion: Scott Dossett moved that field pH and specific conductance measurements be eliminated beginning January 2003.

Friendly amendment: Jane Rothert recommended that AIRMoN field measurements not be included in discontinuance of field chemistry measurements. Amendment accepted.

Mark Nilles seconded motion.

Motion failed (8 votes submitted for the motion, 9 voted against discontinuing field measurements-replicate results from May 2002 vote on same motion).

AGENDA ITEM 6 – Central Analytical Laboratory (CAL) Report and update on the Plastic Bucket Liner Study, Karen Harlin/CAL

A copy of the following report was provided to attendees, but was not presented at the meeting in its entirety.

Central Analytical Laboratory (CAL) Report
Updated from last report to NOS/Executive Committee Fall, 2001

Site Operations

- ~ NTN = **246** active sites as of 09/6/02 (includes 2 collocated sites 02OR and 98WI)
 - ~ 15 sites or 106.5% increase since last report August 2001
- ~ AIRMoN = **10** active sites
- ~ CAL inventory required to maintain site sampling supplies is now **290** buckets, lids, and 1-liter bottles/wk CAL is meeting those deadlines
- ~ Site Operator Training Course
 - ~ 32nd Site Operation Training Course was held at CAL on April 9-11, 2002. This year special sessions for MDN and AIRMoN operator training were included. This year's participants represented 28 sites; 6 of these sites became active since May of 2001, and 2 sites are scheduled to start in 2002. Pictures are available at <http://nadp.sws.uiuc.edu/cal> in What's New or Training. The Central Analytical Laboratory has held Operations Training Courses since 1979. As of April 2002, 745 people have attended training at the CAL and 257 sites have been represented.

- ~ 33rd Site Operations Training Course is scheduled for **April 8-10, 2003.**
- ~ NTN Lid Seal Change: scheduled June 4, 2002. As of July 88 % returned. New instructional labeling added.
- ~ 2003 CALendar, focus is 20-yr anniversary sites. Distributed at Fall Technical meeting and in September mailings.

Laboratory Operations

- ~ Automated pH & specific conductance data transfer. Oct., 2001 (AIRMoN) and Feb., 2002 (NTN)--Began use of the automated transfer of pH, specific conductance, lab comments, and contamination codes into NTN & AIRMoN databases via a custom designed laboratory information management system (LIMS). New technology (such as touch sensitive monitors) are incorporated into the system. Intensive in-house input and testing was involved in the design of this system which eliminates double-entry of manually recorded results into the databases.
- New instrumentation is under review to replace the 10 year old AAS for major cations (Na, K, Mg, Ca). Targeting reduced volume (now need 8 mL) and elimination or automated addition of modifier solutions which may contaminate the samples.
- NADP Archive Samples: NTN active archive and current (special) samples approved at the Fall 2001 and Spring 2002 meetings were shipped to researchers. An ad hoc committee of NOS is reviewing cost recovery for archive sample handling and archive policies. They will report to NOS at the spring 2003 meeting. (See Program Office report for details).

QA/QC

NOS Review/Audit of CAL operations March 13-15, 2002: The review team was lead by Brooke Connor, Laboratory Evaluation Project, Branch of Quality Systems, USGS. Two other reviewers participated, Nancy Lance, Laboratory Supervisor, CAPMoN, Environment Canada and Bob Brunette, Research Scientist, Frontier Geosciences. The CAL received the final report from the review team May 13, 2002. The CAL Director reviewed the findings with staff and submitted a draft response report to the NADP QA Manager prior to the fall meeting. Copies of the draft report are available to NOS at the fall meeting. The final report will be distributed in Oct. 2002.

2000 CAL Quality Assurance Report status. Editorial review in process. Anticipate availability by end of year.

2001 CAL Quality Assurance Report status. In progress and will be back on schedule for Spring 2003 release.

CAL Quality Assurance Plan, August 2002 is completed. Extensive review and editing in 2001 and early 2002. Delivery from printers

week of Sept. 9th. Will be on web and ready to mail within the month.

- All SOPs reviewed, dated and newly distributed in 2002.
- Quality Assurance Programs (participation in external QA programs)

USGS

Field Blank Samples (~100/year)

Blind Audit Samples (~100/year)

Interlaboratory Comparison Samples (26 sets/year, 4 per set)

National Water Research Institute, Burlington, Ontario (NWRI),

Ecosystem Interlaboratory QA Program, Two sets per year, 3 per set

World Meteorological Organization (WMO)/Global Atmospheric Watch (GAW)

Acid Deposition Monitoring Network in East Asia (EANET),

NEW PROGRAM 2001

Norwegian Institute for Air Research (NILU), 1 sample set/year, 4 per set

National Water Research Institute, 2 sample sets/yr, 10 per set

Data Management Operations

Data to Program Office is on schedule!

• NTN Data to PO through **early June 2002**

• AIRMoN Data to PO through **mid-June 2002**

Site Information Database nearly complete with information for all three networks (NTN, MDN, AIRMoN). Includes contact, location, equipment, role, meetings attended, training courses attended, etc. Programming by Larson, data entry and data entry/updates by CAL.

Research

The **World Meteorological Organization/Global Atmospheric Watch (WMO/GAW)** sponsors an intercomparison study, the Analysis of Reference Precipitation Samples by WMO Laboratories on an annual basis with 96 laboratories in 48 countries. The Central Analytical Laboratory (CAL) has participated in these studies for many years. CAL prepares 122 sample sets of three samples that are then sent to the Atmospheric Science Research Center in Albany, NY. Two sets of 2001 samples were prepared. The Albany laboratory distributes these intercomparison samples to approximately 100 laboratories worldwide. The WMO/GAW coordinates international atmospheric deposition monitoring and quality assurance for the participating laboratories. Jane Rothert coordinates this effort for the CAL.

Evaluation of bucket liners for NADP sampling

The NADP invests considerable effort and expense in washing and shipping buckets to sites. The capital investment in buckets, and mailers to ship them in, limits the ability of the network to investigate sampler designs that could improve the collection efficiency of blowing precipitation. A study protocol was developed to determine the feasibility of using plastic bucket liners for the NADP project. The study will be conducted in 2002-2003.

Organic and total nitrogen in NADP precipitation samples

The NADP measures inorganic nitrogen (as nitrate and ammonium) in precipitation. Currently, there is interest in determining the amount of organic nitrogen in precipitation. Methods to determine organic nitrogen require a total nitrogen analysis; the organic nitrogen fraction is then determined by subtracting the inorganic nitrogen from the total amount. The CAL has acquired a Lachat Quick Chem 8000 and has dedicated it to total nitrogen measurements. Nitrogen compounds are oxidized in-line to nitrate using alkaline persulfate/UV digestion. After digestion, nitrate is quantitatively reduced to nitrite by passage of the sample through a copperized cadmium column. The nitrite is determined by diazotization with sulfanilamide under acidic conditions to form a diazonium ion. The diazonium ion is coupled with N-(1-naphthyl)ethylenediamine dihydrochloride and measured at 540 nm. Method evaluation is completed and sample analysis has begun. Recoveries for urea and EDTA were determined to be 101.8% and 99.8% respectively. CAL is looking at the effects of sample storage and handling on total nitrogen results. NTN and AIRMoN sites are subsampled after they are received at the CAL and analyzed ASAP. They are then maintained at ambient, refrigerator and freezer temperatures and reanalyzed after 2 weeks. Results of unfiltered, 0.45 micron filtered, and 0.2 micron filtered samples at these temperatures are also determined. An aliquot is collected for the NTN samples sent to Dr. Castro, Univ. of MD (for his total nitrogen research of the Chesapeake Bay watershed) to compare or results with his laboratory. Data were recently received from Dr. Castro's laboratory and will be compared with CAL results. Research in this area is preliminary but progressing (See poster at the Fall 2002 meeting).

Investigate the presence of organic acids (such as formate and acetate) in refrigerated AIRMoN samples. Organic acids are believed to have a short-lived, yet important role in the acidity of atmospheric deposition. Since AIRMoN samples are refrigerated continuously after collection in the field, organic acids may be present in high enough concentrations to make measurement possible without further sample stabilization. An investigation into the amount of organic acids, specifically acetate and formate, in AIRMoN samples could result in important, yet currently missing, atmospheric deposition information. Special equipment has been acquired for this purpose, but an Alltech column is needed and little time has been available to date for method evaluation.

Biohazards and microbes in precipitation: Van Bowersox, Karen Harlin, and Dr. Carol Maddox, a microbiologist at Veterinary Medicine, are collaborating on a project to look at microbial agents in precipitation. They have submitted an abstract to DOD to determine the agencies interest in funding this research, but no funding is available to date. CAL is collecting excess sample from 20 states west of the Mississippi to be used for method development and preliminary investigations. Over 200 samples have been retained to date. These samples are pooled by state to yield 4-liter samples required for filtering and method development. TX and SD samples are pooled by region within the state since documented cases of anthrax in animals were available for these states (for example SW Texas and Eastern SD).

AGENDA ITEM 7 - Archive Sample Distribution, Karen Harlin/CAL

Archival Samples (updated 9-6-02)

Below is a summary of recent activities relating to archival sample disposition:

- (1) Archival Samples (NTN >5 yrs old, AIRMoN > 2 yrs old; samples to be purged from CAL archives)

Dr. Tyler Coplen, U.S. Geological Survey, Reston, VA 20192, 703-648-5862, tbcoplen@usgs.gov

Received 1997 and 1998 AIRMoN archival samples collected at two sites collocated with NTN (OH09, PA15). Dr. Coplen has previously received archival samples from these same stations. His research involves testing the hypothesis that daily composited and weekly samples have the same $^{18}\text{O}/^2\text{H}$ signal.

Brian Scott, Aquatic Ecosystem Protection Research Branch, National Water Research Institute, Canada Centre for Inland Waters Burlington, Ontario L7R4A6, 905-336-4934, brain.scott@cciw.ca

Received 1997-1998 AIRMoN archival samples from DE02, MD15, and NY67. Brian has analyzed for haloacetic acids (such as trifluoroacetic acid, monochloroacetic acid, dichloroacetic acid and trichloroacetic acid) and perfluoroalkanoic acids in monthly pooled samples from these sites. He has published an article on haloacetic acids in Canadian lake water and precipitation (*Environmental Science and Technology*, 34:4266-4272). He wants to extend his analysis to urban U.S. sites and is interested in samples from NTN sites near urban areas. He is also receiving CAPMoN samples.

Dr. Jeffrey Welker, Natural Resource Ecology Laboratory, Colorado State University, Fort Collins, CO 80523-1499, jwelker@nrel.colostate.edu

All remaining 1997-1998 archival AIRMoN samples (not sent to other researchers) were sent to Dr. Welker. He will quantify the isotopic ^{18}O and ^2H characteristics of individual rainfall events (daily samples) in relation to temperature, storm track, and relative humidity and will link these results to ongoing studies of the isotopic characteristics of weekly NADP samples.

Dr. Emi Ito, University of Minnesota.

1996 archival NTN samples from 8 sites (IA08, LA12, MT07, NE15, NY52, NC03, WI25, PR20) will be sent to Dr. Ito this fall. She seeks to obtain a modern calibration of the hydrogen and oxygen isotopic ratios of meteoric water at selected NADP sites over a 5-year period. By constructing time series records of the data at these sites, she hopes to establish the relationship between isotopic ratios in precipitation and in lacustrine carbonates, soil carbonates, aquatic cellulose, etc. Previously, Dr. Ito received 1993 archival samples from 24 sites and 1994-1995 archival samples from these 8 sites. Dr. Ito has approval for up to 25 stations through 1997.

Stephen Monroe, Hydrologic Technician, USGS Water Resources Division,
Flagstaff, AZ 86002, 928-556-7141, samonroe@usgs.gov

July 2002 this request for access to active or expired archival samples for a site in northern Arizona (AZ03), was approved by the executive committee. The project title is "Hydrogeologic Assessment of South Rim Area, Grand Canyon National Park". The project objectives are: 1) determine if local or regional recharge contribute to selected south rim springs issuing from the regional limestone aquifers and 2) develop baseline water-chemistry information for selected springs. Samples will be measured for tritium, carbon 13/12, oxygen 18/16, and hydrogen 2/1. The results of these analyses will be used to define isotopic characteristics of precipitation at the south rim of the Grand Canyon. These data will be used to compliment well and spring data from this region to address ground-water flow path and residence time questions. The minimum useful volume is 30 ml, which would be sufficient for all analysis. It is possible that different analyses could be run on discrete samples.

Sites and samples requested-The archive samples requested were collected at NADP/NTN Monitoring Location AZ03, Grand Canyon National Park, Coconino County, Arizona. Precipitation in this region is highly variable, therefore it is unknown to me the specific sample dates that are available. He has been sent a list of available archive samples for this site and has responded with samples of interest. Samples will be sent later this year.

- (2) Active Archival Samples (NTN <5 yrs old; AIRMoN < 2 yrs old; These samples require removing an aliquot while maintaining a minimum volume of 30 mL in CAL archives)

Dr. F. Edwin Harvey, Associate Professor of Hydrogeology, School of Natural Resource Sciences & Conservation and Survey Div., Univ. of Nebraska-Lincoln
68588-0517, 402-472-8237, feharvey1@unl.edu

Received samples from NE15 (Mead) for 1999-2000 and has previously received samples from this site for 1993-1998. Dr. Harvey will combine the samples to make monthly or seasonal tritium measurements. Previously, he received archival NTN samples from NE99 (N. Platte) and CO22.

Dr. Madhav Machavaram, E.O. Lawrence Berkeley National Laboratory,
Berkeley, CA 94720, 510-486-5026, MVMachavaram@lbl.gov

Received active archival samples from nine NTN sites (AR03, CA42, KS32, LA30, OK00, OK29, TX10, TX56, & UT99). He will use ¹⁸O and ²H measurements to identify water body or land surface sources of water vapor producing the clouds and precipitation at these sites. By determining water vapor sources over space and time, Dr. Machavaram

hopes to improve our understanding of hydrologic cycling in the southern Great Plains and how changes in the cycle influence climate. The CAL has sent Dr. Machavaram subsamples for Jan. 1999-Sept. 2000 archival samples. Additional samples will be shipped at the end of the mandatory one-year holding period.

Dr. Tyler Coplen, U.S. Geological Survey, Reston, VA 20192, 703-648-5862, tbcoplen@usgs.gov

Received NTN samples collected at NTN & AIRMoN collocated sites (OH09, PA15) during 1997 and 1998. Dr. Coplen previously received archival AIRMoN samples from 1992-1996 and archival NTN samples from 1994-1995. His research involves testing the hypothesis that daily composited and weekly samples have the same $^{18}\text{O}/^2\text{H}$ signal.

Dr. Jeff Welker, Natural Resource Ecology Laboratory, Colorado State University, Fort Collins, CO

Received NTN subsamples from WI36, Trout Lake, for June-August 2001 and subsamples from three Oregon sites (02-Alesia, 10-Andrews Forest, and 18-Starkey) for June-September 1996-1997, all of 2000, and July-August 2001. Welker (CSU), Ehleringer (U-Utah), Berry (Stanford), Bowling (U-Utah), McDowell (Oregon State), and Bond (Oregon State) are conducting studies in northern Wisconsin and across Oregon addressing carbon and water cycling in deciduous and evergreen forests. They are interested in documenting the isotopic relationship between the oxygen of precipitation and the oxygen of CO_2 . These measurements will help partition the net flux of CO_2 and understand the fundamental linkages between the water and carbon cycle. The 1996, 1997, and 2000 subsamples for the three Oregon sites were shipped in January 2002. The remaining shipments are pending the one-year holding period prior to shipment.

Jim White and Dr. Welker also requested all of the active archive samples for the 16 sites listed below so that they can develop complete time-series for these key locations. This request was approved July 2002 by the executive committee. These samples are needed to partially complete a component of their NSF project which includes the annual temperature, ^{18}O & D relationships between 1989 to 2001. They anticipate completing a similar time series for many of the other sites; however, in order to maximize accomplishments during this funding cycle, they want to evaluate these sites in particular. They have been working with Bob Larson on developing isotopic maps for the entire U.S. They are in the final stages of completing the analysis and carrying out final QA/QC before producing a final set of maps for a manuscript in preparation. They will present these maps at the Seattle meeting in September and anticipate submitting the manuscript before Sept. 1. Sites requested are: AR03, AZ99, CA99, CO02, FL11, IL63, MA13, MT00, NC35, NV05, NY10, TX03, VT99, WA14, WI36, and WY99.

- (3) Incoming excess sample for NTN (This is sample volume in excess of that required for CAL analysis and archival. It is collected on special request only)

Dr. Deborah Neher, Associate Professor of Ecology, Dept. Of Earth, Ecological and Environmental Sciences, The University of Toledo

Received samples from four Midwestern NTN sites (IN20, MI26, MI52, & OH15) for the period May 2001 to June 2002. The CAL collected current samples in excess of the ~200 milliliters required for analysis and archival. The CAL pooled samples by site and by

month of collection to obtain the minimum volume necessary for her research. The CAL has shipped monthly pooled samples for May 2001-June 2002. Dr. Neher is studying the nitrogen budget in temperate oak savanna forests. She will measure $^{15}\text{N}/^{14}\text{N}$ in precipitation to assess the role of atmospheric nitrogen inputs to microbiotic crusts, such as lichens and algae. She will use isotopic ratios to trace the origin of the nitrogen. Dr. Neher visited the CAL in June 2002 to discuss her research with Van and Karen.

Dr. Mark Castro, Associate Professor, Appalachian Laboratory, University of Maryland Center for Environmental Science, Frostburg, MD 21532-2307, 301-689-7163, castro@al.umces.edu

Received excess samples from current sample processing operations for MD03 and MD13. Dr. Castro is measuring total nitrogen (organic and inorganic) in precipitation in Chesapeake Bay watershed. He also is interested in MD15 (Smith Island) samples; however, MD15 is an AIRMoN site and NADP has no policy for subsampling AIRMoN samples prior to the end of the 2-year holding period. At its Spring 2002 meeting the Network Operations Subcommittee formed an ad hoc committee to address this issue. Dr. Castro requested excess sample from currently received samples for PA00, WV18, VA28, and NC35 which were approved by the executive committee in July 2002. These samples will be used for his research on total nitrogen (organic and inorganic) in precipitation in the Chesapeake Bay watershed. The CAL has been collecting these samples since July 2002 and will send them to Dr. Castro in the next few weeks.

Dr. Eugene Perry, Professor of Geology, Northern Illinois Univ., DeKalb, IL Excess samples from current processing operations for IL46 and MO43 (downwind and upwind respectively from St. Louis) were approved May 2001 at the Spring meeting. Dr. Perry will check the feasibility of a newly discovered isotopic parameter that may help make it possible to distinguish sources of sulfate pollution. This research is based on a recent report that atmospheric oxidation of sulfur produces sulfate with an oxygen isotope signature that distinguishes it from virtually all mineral sulfate. This signature (non mass-dependent isotope fraction) can only be determined by measuring the relative abundance of all three stable isotopes of oxygen (^{16}O , ^{17}O , and ^{18}O). He will need pooled samples to obtain 10 samples from each of these sites of >800 mL. CAL has been collecting samples since May 2002.

(4) Pending Archival Samples Requests for Executive Committee Approval.
No requests are pending as of 9-6-2002.

(5) The following researchers have expressed interest in NTN archival samples or subsamples. No details of sites or dates of samples requested have been received, therefore, no complete requests are pending at this time. Interest has been expressed by Simon Poulson (Department of Geological Sciences, Univ of Nevada-Reno) and Mark Lynford (Department of Renewable Resources, Univ of Wyoming). Poulson is interested in looking at stable isotopes in precipitation. He may submit a request later this year. Lyford is interested in doing isotopic analyses. He is part of Welker's project and is interested primarily in April 2001 samples.

DISCUSSION

Mark Nilles presented a request by Carol Kendall (USGS, National Research Program) to receive 100 volume-weighted, annual composite samples representing 100 NTN sites for the year 2000. Carol Kendall is interested in determining the temporal and spatial variations in the $\delta^{15}\text{N}$, $\delta^{18}\text{O}$, and $\delta^{17}\text{O}$ of nitrate (selected samples will be analyzed for $\delta^{15}\text{N}$ of ammonium) in precipitation collected from 100 NADP/NTN sites. Analysis of these isotopes may help to differentiate among the different types of atmospherically derived nitrate and ammonium, and quantify atmospheric deposition of nitrogen to land and water.

Motion 5: Scott Dossett moved that Carol Kendall (USGS) receive the requested, pooled samples from 100 sites, for the year 2000.

Motion seconded and passed.

AGENDA ITEM 8 – ATS External Site Survey/Audit Reports, Tom Jones/ATS

Please see Attachment 5 for presentation.

- ATS has audited 52 sites:
 - 37 NTN
 - 8 were new sites and have never been visited by ATS
 - 13 MDN
 - 6 were new sites and have never been visited by ATS
 - 2 AIRMoN
 - both sites have never been visited by ATS
- Visited geographic locations within the US include:
 - CA, HI, IL, IA, ME, MO, NH, NV, VT, WA
- Visited geographic locations within Canada include:
 - Newfoundland, New Brunswick, Nova Scotia, Quebec
- This effort has taken the following to accomplish:
 - 9,933 driving miles
 - 27,690 flying miles
 - 551 gallons of gasoline
- Remaining audits include:
 - AK, DE, KY, MD, NJ, NY, PA, VA, WA, WV, British Columbia
- Revamping of site audit procedures and developing audits for the MDN and AIRMoN has resulted in delay of data being provided to the Program Office
 - 98% of the issues have been resolved and data transmission will resume regular schedule in September 2002
- Recurring problems for revisited sites include:
 - Lack of training for replacement operators
 - Vegetation control

- Maintenance of backup batteries
- ATS recommendation for corrective actions for revisited sites:
 - Offer two training schedules that includes all three networks
 - Have site liaison contact replacement operators to discuss protocols
 - Determine with site operator if there is a need for a backup battery
 - Trim and remove trees from older sites
- Recurring issues with new sites:
 - Site set up
 - Operation of site
 - Operation of Belfort raingage
- ATS recommendation for corrective actions for new sites:
 - Network representative should visit site and help with site set up
 - Network representative should train operator in sample collection and processing, and operation of collector and Belfort raingage
 - Network representative should check collector operation and calibrate the raingage, if needed

**AGENDA ITEM 9 – Belfort Fine Baseline Adjustment Screw Proposed Modification,
Scott Dossett/NADP and Tom Jones/ATS**

Please see Attachment 6 for presentation.

Synopsis:

- A red knob located at the top of the Belfort raingage mechanism is intended to allow a fine zero adjustment (according to the Belfort instrument manual)
- During the last four and a half years, ATS has found many raingages out of calibration
- The red knob is the only easily visible adjustment when looking through the raingage housing door, resulting in overadjustment and degradation of raingage calibration
- Even though site operators have been instructed not to use the red knob for zero adjustment, it often is
- Operators are not aware of the red knob's function and that its adjustment will cause the gage to go out of calibration
- The problem lies in the ball and socket design of the coarse adjustment that over time tends to bind and does not allow the design to function as a ball and socket fitting
- When the red knob is adjusted in an improper manner it causes the z-axis of the main spring to be off center, changing the linearity of the spring
- Scott Dossett and Tom Jones propose to eliminate the red knob and replace it with a torx head screw and a lock nut
- The screw would be set to the OEM designed position and locked into place
- When the gage needs to be adjusted to zero, the operator's only choice would be to adjust the silver, coarse adjustment knob of the gage

- This change would cost the network approximately \$50
 - The change would be made by ATS during site audits
 - This adjustment will not change the function of the gage
-

Motion 6: Tom Jones moved that the Belfort fine baseline adjustment screw modification be approved.

Jane Rothert seconded motion.

Motion passed.

AGENDA ITEM 10 – Ad Hoc Committee Update: Review of NADP Siting Criteria, Chris Lehmann/NADP

Background:

The ad hoc committee was initiated at the fall 2001 meeting. A progress report was presented at the May 2002 meeting and is documented in the meeting's minutes.

Please see Attachment 7 for the slide presentation on siting criteria.

Please see Attachment 8 for the NTN and AIRMoN list of siting rules and guidelines.

Committee on Siting Science

Status as of Sept. 6, 2002

1. We have taken as our charge to review and comment on the scientific foundation for the NADP siting criteria.
2. We consulted the various NADP documents stating the siting criteria and talked to individuals involved with developing the criteria in the 1978 to 1983 period in order to prepare a short history of the efforts:

History of the 33 criteria:

The first version of the site criteria is found in the 1978 document ("Site Selection and Certification") by Richard Semonin (a meteorologist) and Herb Volchuk (a physicist). These two authors combined had about 50 years of experience in subject areas including the measurement of precipitation amounts and the collection and measurement of precipitation quality using various bulk (total) and wet/dry collection devices. The 1978 set of criteria consisted of 5 items (1 in group A; 2 in group B; and 2 in group C).

From 1978 to 1984 the NTN network grew at a rate of about 25 sites per year. There was a need to have a more detailed set of criteria that could be applied as new sites were

requesting entry into the network. Such a set evolved from discussions by scientists at the CAL, the CO, and the NADP technical committee scientists. The culmination of the evolution process is found in the criteria as recorded in the July 1984 document "Instruction Manual: NADP/NTN Site Selection and Installation" prepared by D. S. Bigelow. The site criteria remain essential unchanged today, 2002. The substance and wording for the criteria published in 1984 were developed/finalized during a meeting called for this purpose, held at the West Point Military Academy in 1983, and attended by Van Bowersox (of CAL), David Bigelow (of the CO), John Robertson, Richard Graham, and Jerry Wilson, the later three all staff at West Point.

3. We note that some of the existing criteria were in fact statements of procedure to be followed (i.e. SOPs) and not siting criteria.
4. We note that in general the criteria have qualitative scientific support, but often there does not exist scientific publications to support the specific number stated in a criterion. For example, a criterion states that the minimum distance between the Aerochem and the raingage is to be 5 meters; we are not aware of any publication that shows that "5" is better than "6" or "7". However we feel that it is important for a monitoring network to project the image of uniformity, and this may be the best justification for choosing a specific number such as has been done for the Aerochem-raingage minimum separation distance. The 45 degree rule is an example of a criterion that could perhaps be 43 or 47 (scientific studies likely do not exist to say 45 is superior to 43 or 47) but many scientific papers related to raingages could be found where 45 is stated as criterion being used so it is "good scientific practice" for NADP to adopt the specific value of 45.
5. We note that all criteria do not relate to all chemical variables being measured by NTN and AIRMoN. For example criteria related to traffic on unpaved roads would be related to crustal ions such as Ca and Mg while criteria related to livestock would be related to NH₄.
5. We consulted the various NADP documents stating the siting criteria. We organized the criteria into a list of 33. The list of 33 was subdivided into four types:
 - A Criteria - To Minimize Influence of Anthropogenic Emission Sources to Air: Regional Requirements, > 10 km
 - B Criteria - To Minimize Influence of Anthropogenic Emission Sources to Air: Local Requirements, < 10 k
 - C Criteria - On-site Requirements, < 30 m, To Minimize Splash and Wind Flow Alterations
 - D Criteria - Other Criteria Affecting Sample Representativeness

6. Currently the committee is reviewing the 33 criteria and developing recommendations (a) for changes in wording, (b) to omit some of the 33 from the list and (c) changing the names of the 33 **items from siting criteria to siting rules and siting guidelines. The committee feels it is quite useful and important to move to try to move to the rule/guideline terminology for siting features.** See the spreadsheet to note our progress in reviewing the 33 site features. We need at least one more conference call to finish this task. To do this review we are asking Chris Lehmann to describe how the Program Coordination Office (PCO) is actually interpreting and implementing the current 33 criteria. We note if the original text of the criteria used the word “must” or “should” in describing how a criterion was to be implemented.

Rules/Guidelines (RGs):

Our **definitions** of the terms rules and guidelines are being refined as we continue our work on the original list of 33. Our current working definition is: **Siting rules are features that must be adhered to by the sites. Siting guidelines are features that are desirable and should be adhered to if possible.** You will note that these definitions relate to how NADP is/will enforce them. If NADP were to kick out a site based on siting issues, it would probably mean that rules, as opposed to guidelines, were not being met. If NADP were to segregate data from a site (e.g. put the data “in the back of the book”), this would probably mean that rules, not guidelines, were being violated. Perhaps in letting a new site into NADP, the decision would be relatively automatic if no rules (as opposed to guidelines) were going to be violated. If we feel there are specific and convincing scientific analyses and publications that suggest a site feature will result in unrepresentative data being produced, then it would seem that the feature should be stated as a rule as opposed to a guideline. A problem that the committee is struggling with is that usually we do not have convincing, comprehensive published scientific data to make something a rule as opposed to a guideline. Finally there is the issue of providing site information to data users (PCO has been asked to do this). Would the PCO specifically note which guidelines and rules are not being met by each site?

We noted if the original text of the criteria used the word “must” or “should” in describing how a criterion was to be implemented.

AGENDA ITEM 11 – Network Equipment Depot (NED) Report, Scott Dossett/NADP

Please see Attachment 9 for presentation.

Synopsis:

- 394 parts (motor boxes, sensors, gages, etc.) have been replaced in 12 months
- 289 parts are available

- Due to budget constraints, shipping 2nd day UPS delivery for every failure has been changed to regular UPS shipping to most eastern and Midwestern states and third day delivery to sites located in western states
 - Shipping change has resulted in a savings of \$9775
 - Hybrid clocks being sent to sites that have requested replacements
 - Have a provision of motor boxes and sensors
 - Improvements in repair techniques are not saving much time
 - Cost of repair will increase in the future
 - Current system allocates approximately \$104 per site per year
-

AGENDA ITEM 12 – Update on NOAA Climate Reference Network Efforts, Scott Dossett/NADP

Please see Attachment 10 for presentation.

Synopsis:

- Climate Reference Network was designed to monitor climate change
 - Climate Reference Network would like help from the NADP to find suitable sites for their equipment, possibly collocated with NADP equipment
 - A layout of a typical Climate Reference Network site is presented (please see Attachment 10 for diagram)
 - Discussed actions the Program Office would take and logistics involved in initializing site selection, operation requirements, collaboration, etc.
-

Motion 7: Election of new NOS secretary

Mark Nilles nominated Karen Harlin (CAL) as secretary for 2003-2004.

Motion seconded and passed.

ADJOURN